Device for training golf

The present invention relates to a golf practice apparatus according to the preamble to claim 1. Specifically it relates to such a practice apparatus, which, at its best, can be used to determine the stroke's power and direction, to achieve the best possible practice result.

A large number of golf practice apparatuses are known. These are based on a great variety of operating principles. In some, a golf ball or similar object to be struck is located at the end of a rigid arm. In such constructions, the player entirely loses the real feel of playing golf, as a rigid construction cannot give a real sense of striking a ball. In another kind of apparatus, a flexible wall is simply set up, and returns the balls as they are struck. This apparatus gives no information on the stroke's strength, while even its direction can only be seen by staring at the possible place the ball strikes and observing it visually.

In yet another type of apparatus, which includes the present apparatus, the ball is suspended in a suitable suspension device. In one such apparatus, the ball is suspended from a vertical axle, the power of the stroke being measured from the ball's horizontal rotation. In another, a ball connected to a suspension device rotates on a horizontal bar, while measurement takes place similarly to the previous case.

In the following, various publications are referred to using only their numbers. US patent publications 3,031,889; 5,386,997; and 3,666,271; as well as 4,014,552; 4,971,326; 3,784,207; and 5,011,155. Other solutions relating to the field are disclosed in publications GB-1070409 and GB-1164053.

These and other known solutions have certain drawbacks, which are next examined briefly. The apparatuses referred to have not resolved the controlled and rapid return of the ball, or the electrical measurement of the degree of deviation of the ball's direction of flight. They also do not show the change, made by the stroke, in the position of the ball on a fairway shown on the display. In the solutions using some form of measurement of the direction of flight of the ball, measurement is often too early, before the final direction of the ball is known, giving erroneous or at least

inaccurate measurements.

The present invention is intended to eliminate these drawbacks, facilitate the practice of strokes, and show the precise effect of even a small change in stroke during golf practice. An adapted embodiment of the invention allows real clubs to be used in home golf practice. Thus, in the best case, it is possible to show play different golf courses on a computer display.

These and other advantages and benefits of the invention are achieved by means of an apparatus according to the invention, the characteristics of which are disclosed in the accompanying Claims.

In brief, it can be stated that, according to the invention, the ball is suspended on a line or similar suspension device, which places the ball slightly above the striking base. However, to avoid swings that would disturb the placing and striking of the ball, it is best to place the ball so that it at least touches the base or tee. This also makes it possible to move the ball to some extent, to obtain the best striking point. The suspension must not, however, be so loose that the point where the suspension device is attached to the ball can move away from the topmost part of the ball.

Naturally, the upper end of the suspension device is attached to a suitable frame construction. In its simplest form, the attachment can be direct, but it is best arranged through a device that can be used to illustrate the length of the stroke. When the ball is struck, it begins a pendulum motion defined by the suspension device, following a nearly circular path, as described later in greater detail. The direction of motion of the ball naturally depends on the force and especially the direction of the impact when the club strikes it.

In the striking base of the apparatus there is a raised cushion-like buffer component in the path of the ball, to which the ball rises due to the force of the stroke and from which the ball swings back in a controlled manner, to be struck again. The force of the stroke on the ball tightens the suspension device into a straight line, while the pendulum-like movement of the ball, stopped by the buffer cushion, keeps the suspension device straight for as long as the ball is stopped. A connecting device

can be used to measure the precise direction of flight of the ball from the direction of the line or other suspension device. The assumed distance of the flight of the ball is measured from the amount of movement of the suspension device against a suitable restraining force. According to one embodiment of the invention, the direction and distance measurements obtained from a stroke create a visible mark on the display, depicting the real path or rather end point of the flight of the ball

The invention is next examined with reference to the accompanying drawing, showing a simplified depiction of one embodiment of the invention.

Thus, apparatus 1 is formed by a frame construction 2, to which all the essential components required by the invention are attached directly or by means of suitable intermediate components. The frame can be of any shape, though the figure shows it as being formed by legs. The attachment device 3 of the suspension device 4 of the ball, which usually includes a device measuring the direction or length of the stroke, is located in one set of legs of frame 2. The ball 5 is attached to the lower end of suspension device 4, with ball 5 hanging freely from the suspension device and preferably physically placed to touch the striking base or tee.

The golfer 6 takes up a conventional striking position in relation to ball 5 and strikes the ball from this position, just as if playing on a normal golf course.

The frame of the apparatus is shaped so as to leave suitable space for the path of the club, so that the swing cannot hit the apparatus. In fact, the whole apparatus remains inside the arc of the stroke of the club.

In the direction of the stroke on the path of the ball rising from the striking base, at roughly the distance of the ball from suspension device 4, there is a buffer 7, onto which ball 5 swings at the end of suspension device 4 when struck, and from which it rebounds like a pendulum mainly guided by its suspension device 4, to be struck again. Though the stopper surface of buffer component 7 is usually horizontal or nearly horizontal, it can of course be sloped or shaped appropriately to create specific properties. A slope can also be achieved by suitable shaping the cushion component.

In an apparatus according to the invention, ball 5 stops with the suspension device in an approximately horizontal position. The stopping impact is physically received by the bottom surface of buffer component 7. This reduces the stress on the ball's attachment and suspension device and also keeps the suspension device more or less straight, not only over its entire path, but also in the stopping stage.

Obviously, the recoil of ball 5 and other properties can be influenced by selecting an appropriate material for the surface of buffer component 7, which receives the ball. Buffer component 7 can also be adjustable. The ball is returned by gravity, to be struck again.

The direction of the stroke is measured using the direction of movement of suspension device 4. Obviously, there is a wide variety of ways of measuring the direction. Usually, the position of suspension device 4 is measured, in a suitable manner, when it is more or less horizontal, i.e. at or near the end point of its pendulum movement. The direction of the ball can then be reliably measured. The measurement device is marked with the general reference number 8. In certain conditions, measurement can also take place when the ball is already returning to its starting position, though the measurement then involves more uncertainty factors.

Though the figure does not show this in any detail, one alternative is to use a mechanical switch to show the direction of the suspension device. This can be done, for example, using a pin, which suspension device 4 raises to show where suspension device 4 has passed. Several pins can be used in parallel, or else only a single pin can be used to show when the stroke has been on target. The pins can be fitted so that a pin that has risen will remain in place until returned to its initial position, for instance, by being pushed by hand.

Another possible alternative mechanical switch is a plate-like component jointed to a bar, which changes its position when the suspension device strikes it. As in the previous example, the apparatus can be constructed so that the plate remains in the position into which the suspension device has pushed it. Numerous plate-like or other indicator components can be used in parallel.

In one embodiment, electrical switches showing the position of the suspension device, for instance by lighting a lamp or transmitting the position to display 9, can be used instead of mechanical switches.

Suitable guides can be used with the indicator components described above to prevent the suspension device from striking two indicator components simultaneously or going between the indicator components. Examples of such guides are pins with more or less sharp ends, or plates between the indicator components, placed especially at the joint between two adjacent indicator components.

Yet other applications can be used. For example, sensors can be set in the attachment end of suspension device 4, i.e. at the upper end of device 3, to monitor the direction and length of the suspension device, for example, in the same way as a mouse is used to move a computer cursor, and to transmit it to display 9, where a suitable indicator image appears in place of the ball. The direction and/or length can also be monitored using an infrared sensor, a principle used in the latest computer mouses. Another method is to use devices like control switches, which are connected to monitor the position of the suspension device of the ball and to transmit information on the direction of the stroke, preferably electronically, to display 9. Another arrangement is based on a so-called joystick, the movements of which can be suitably shown on the display. Suspension device 4 can be connected to control the joystick either directly or indirectly.

In addition, sensors can be placed in apparatus 1 to monitor the position of suspension device 4, for example, by measuring it from two directions, allowing the exact position of suspension device 4 to be determined. Such measurements can be carried out in any known manner at all, for example, by using infrared or similar light. Obviously, it is possible to measure the position of the ball instead of the position of the suspension device.

Device 3 also includes devices to measure the length of the stroke. At its simplest, this takes place by having the suspension device reel off a braked component or having the suspension device held in place and its movement opposed by a spring,

so that a stroke aimed at the ball tends to pull the suspension device in the direction of the stroke. This movement is measured precisely and the result is shown in a suitable manner, especially as a value shown in figures on the display or as a mark indicating the length of the stroke on the display. Such measurement of the stroke's length is naturally based on the fact that a harder stroke will cause a greater force pulling the suspension device in the direction of the stroke, when a suspension device braked with a spring or similar device will reel out more than with a weaker stroke. The force is converted into units of length.

In its best form, display 9 can have various golf courses entered as backgrounds. The position of the ball derived from the measurements disclosed above can then be shown against such a background, creating an apparently very real practice situation. If desired and in practice the display can be made to move forward in sections, allowing all parts of the display to be shown sufficiently clearly. The ball is shown on the display in a manner selected to suit each user.

One way of showing the direction of the ball and the length of stroke, applies the principle used in devices, in which marks, such as lines, made with a pen-like device on a certain kind of drawing board, are transferred to the screen of a computer terminal. Such a device can be used to make the 'pen' track the movement of the suspension device or ball and transmit it via the drawing board to the actual display. If required, such an image can also be printed.

A possible addition to an apparatus according to the invention is a flap-like return buffer, shown in the figure with the reference number 10. This flap can be made of any material and is mainly intended to stop the suspension device and ball when they return to the striking position after a stroke, preventing them from swinging backwards and forwards. This accelerates the cycle of practice strokes and eliminates the extra work needed to place the ball.

It is obvious that only some of the possible practical components are referred to above by name. These and other components and methods not referred to can be combined as desired to achieve a final result appropriate to any situation. For example, the base can be fitted with a joint allowing the apparatus to be tilted

suitably and in the desired direction, if required. If desired, various sound signs and effects can be used in place of or in addition to the display, to enliven practice or to make it more illustrative.

Although the figure shows only one alternative construction of the base, any permanently installed or moveable base can be used for this purpose. Thus, if desired, the apparatus can be placed in a room for practice, then moved after practice to a suitable storage place. There are very many alternative bases.

The invention is not restricted to the embodiments disclosed above, but can be varied according to the basic idea disclosed and within the scope of the accompanying Claims.